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10/560,131	05/12/2006	Hiroyuki Ochiai	283232US2XPCT	1358
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER WAITS, ALAN B	
			ART UNIT 3656	PAPER NUMBER
			NOTIFICATION DATE 08/02/2010	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

### Office Action Summary

**Application No.**

10/560,131

**Applicant(s)**

OCHIAI ET AL.

**Examiner**

ALAN B. WAITS

**Art Unit**

3656

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 May 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 21-33 and 39-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-33 is/are rejected.
- 7) ☒ Claim(s) 39-44 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB06)  
Paper No(s)/Mail Date 4/28/2010
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "the engaging portion of the **rotation member** includes a groove" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Objections***

2. Claims 39-44 are objected to because of the following informalities: The claims depend from claims that are canceled. It is unclear if the claims are supposed to depend from one of claims 21-33 or if they are supposed to be canceled. Appropriate correction is required. Since the claims depend from canceled claims, the examiner assumes that the claims 39-44 should also be canceled and thus has not examined them.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 21 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Ghosh USP 5190450.

Ghosh discloses a similar device comprising:

**Re clm 21**

- Engaging portions (22, fig 3) formed on a cylindrical side surface around a circumference of the rotation member (22 and 14, fig 3)
- The engaging portions being rotatably supported by the housing and rotating relative to the housing

- A coating (col 4, ln 7-13) covering the engaging portion and including one or more wear-resistant materials selected from the group consisting of Si, cubic BN, TiC, WC, SiC, Cr<sub>3</sub>C<sub>2</sub>, ZrO<sub>2</sub>-Y and TiB

The following limitations are product-by-process limitations:

- The coating being deposited from a tool electrode including the wear-resistant materials by processing the engaging portion as a workpiece with electric spark machining

**Re clm 24**

- The electric spark machining is carried out with rotating the rotation member

The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

**Re clm 25**

- A groove (30, fig 5 and 6)

**Re clm 30**

- A gear box comprising the housing of claim 21

**Re clm 26**

- The rotation member (shaft 22, fig 3)
- A supporting portion (plain bearing means, claim 1) configured to rotatably support the rotation member
- The rotation member rotating relative to the housing

- A coating covering (claim 2) a bearing of the supporting portion into which the rotation member is inserted
- The coating including one or more wear-resistant materials selected from the group consisting of Si, cubic BN, TiC, WC, SiC, Cr<sub>3</sub>C<sub>2</sub>, ZrO<sub>2</sub>-Y and TiB

The following limitation is a product-by-process limitation:

- The coating being deposited from a tool electrode including the wear-resistant materials by processing the engaging portion as a workpiece with electric spark machining

**Re clm 29**

- The bearing includes a groove (30, fig 5 and 6)

**Re clm 31**

- A gear box comprising the housing of claim 26

5. Claim 26 is rejected under 35 U.S.C. 102(b) as being anticipated by Fujii USP 5660480.

Fujii discloses a similar device comprising:

**Re clm 26**

- The rotation member (shaft 1, fig 1)
- A supporting portion (bearing surface: col 7, ln 28-35) configured to rotatably support the rotation member
- The rotation member rotating relative to the housing

- A coating covering (layer of solid lubricant or material of excellent wear resistance, col 7, ln 32-33) a bearing of the supporting portion into which the rotation member is inserted
- The coating including one or more wear-resistant materials selected from the group consisting of Si, cubic BN, TiC, WC, SiC, Cr<sub>3</sub>C<sub>2</sub>, Zr<sub>2</sub>-Y and TiB

The following limitation is a product-by-process limitation:

- The coating being deposited from a tool electrode including the wear-resistant materials by processing the engaging portion as a workpiece with electric spark machining

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghosh USP 5190450 as applied to claim 21 above, and further in view of Yamamoto USP 6874942.

Ghosh discloses all the claimed subject matter as described above.

Ghosh does not disclose:

**Re clm 22 and 23**

- The coating includes one or more solid lubricants selected from the group consisting of hexagonal BN, Cr<sub>2</sub>O<sub>3</sub>, WS<sub>2</sub>, and BaZrO<sub>4</sub>

Yamamoto teaches a hard coating layer comprising:

- TiC, Cr, WC, cubic BN, and  $\text{Cr}_2\text{O}_3$

Since both Ghosh and Yamamoto teach a hard coating layer comprising WC, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the WC of Ghosh with any combination of the equivalents taught by Yamamoto such as:

- TiC, Cr, WC, cubic BN, and  $\text{Cr}_2\text{O}_3$

to achieve the predictable result of providing the shaft with a hard coating layer for improved wear resistance.

8. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii USP 5660480 as applied to claim 26 above, and further in view of Yamamoto USP 6874942.

Fujii discloses all the claimed subject matter as described above.

Fujii does not disclose:

**Re clm 27 and 28**

- The coating includes one or more solid lubricants selected from the group consisting of hexagonal BN,  $\text{Cr}_2\text{O}_3$ ,  $\text{WS}_2$ , and  $\text{BaZrO}_4$ .

Yamamoto teaches a hard coating layer comprising one or more of the following:

- TiC, WC, cBN, and  $\text{Cr}_2\text{O}_3$

Since both Fujii and Yamamoto teach hardening layers comprising WC, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the equivalents taught by Yamamoto, such as:



- TiC, WC, cBN, and  $\text{Cr}_2\text{O}_3$

to achieve the predictable result of providing the bearing with improved wear resistance.

9. Claim 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghosh USP 5190450 as applied to claim 21 and 26 above, and further in view of Bishop USP 6139261.

Ghosh discloses all the claimed subject matter as described above.

**Re claim 32 and 33**

Ghosh does not disclose:

- A shaft structure of variable vanes for regulating a fluid, comprising the rotation member/housing of claim 21/26

Bishop discloses a shaft structure of variable vanes for regulating a fluid, comprising a rotation member/housing (fig 3).

Since both Ghosh and Bishop teach shaft and bearing assemblies, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the hard coating of Ghosh into the device of Bishop and provide:

- A shaft structure of variable vanes for regulating a fluid, comprising the rotation member/housing of claim 21/26

to achieve the predictable result of improving the wear resistance of the bearing and prolonging the life of the device.

10. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii USP 5660480 as applied to claim 26 above, and further in view of Bishop USP 6139261.

Fujii discloses all the claimed subject matter as described above.

Fujii does not disclose:

**Re clm 33**

- Shaft structure of variable vanes for regulating a fluid, comprising the housing of claim 26

Bishop discloses a shaft structure of variable vanes for regulating a fluid, comprising a housing (fig 3).

Since both Fujii and Bishop teach shaft and bearing assemblies, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the hard coating of Fujii into the device of Bishop and provide:

- A shaft structure of variable vanes for regulating a fluid, comprising the rotation member/housing of claim 21/26

to achieve the predictable result of improving the wear resistance of the bearing and prolonging the life of the device.

***Response to Arguments***

11. Applicant's arguments with respect to claims 21-33 and 39-44 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pope et al USP 6655845 discloses a variety of Applicant's claimed materials.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **ALAN B. WAITS** whose telephone number is (571)270-3664. The examiner can normally be reached on Monday through Friday 7:30 am to 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on 571-272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alan B Waits/  
Examiner, Art Unit 3656

/Richard WL Ridley/  
Supervisory Patent Examiner, Art Unit 3656